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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 4 : D21D 3/00, D21H 3/78

A1

(11) International Publication Number: WO 86/ 04367

(43) International Publication Date: 31 July 1986 (31.07.86)

(21) International Application Number: PCT/SE85/00502

(22) International Filing Date: 4 December 1985 (04.12.85)

(31) Priority Application Number: 8500177-4

(32) Priority Date: 15 January 1985 (15.01.85)

(33) Priority Country: SE

(71) Applicant *(for all designated States except US)*: SCA DEVELOPMENT AKTIEBOLAG [SE/SE]; S-851 88 Sundsvall (SE).

(72) Inventor; and
(75) Inventor/Applicant *(for US only)* : LUNDSTRÖM, Hans, Einar [SE/SE]; Alnövägen 16, S-865 00 Alnö (SE).

(74) Agent: ILLUM, Leif-Otto; Svenska Cellulosa Aktiebolaget SCA, Kungsgatan 33, S-111 56 Stockholm (SE).

(81) Designated States: AT (European patent), BE (European patent), CH (European patent), DE (European patent), DK, FI, FR (European patent), GB (European patent), IT (European patent), LU (European patent), NL (European patent), NO, SE (European patent), US.

**Published**
*With international search report.*

(54) Title: METHOD AT MANUFACTURE OF CARBON-COATED FIBRE MATERIAL

(57) Abstract

A method of manufacturing fibre material containing atomized active carbon. According to the invention, the method is carried out in aqueous suspension with the addition of a tenside.

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# Method at manufacture of carbon-coated fibre material

This invention relates to a method of manufacturing a fibre material coated with atomized particles of active carbon. Such material is used as absorption material , for example, in gas masks, protective clothing, at waste disposal and, above all, in bandages. As a component in bandages, the material absorbs bacteria and odours from infected wounds and assists in a rapid healing of the wound.

Active carbon is well-known as absorption material and is since long used in many different connections. In certain connections, however, it is an advantage if the active carbon could be available in sheet form. Proposals have been made earlier to produce such sheet form. One proposal implies that a normal rayon fabric is exposed to an atmosphere of carbon dioxide at an increased temperature of about 300°C, whereafter a partial carbonizationn of the fabric is brought about by heating to about 900°C. This method, however, is time-consuming and expensive, and the resulting properties of the material did not satisfy the expectations.

It further has been proposed to manufacture a fibre material coated with active carbon by a method in aqueous solution. As fibre material have been used cotton and asbestos, which were disintegrated in water and to which atomized carbon was added at heavy stirring.

The problem, however, has been to make the carbon particles adhere to the fibres. It was tried to solve this problem by adding certain binders to the aqueous solution. The effect of the binder, however, is low, and at the same time the properties of the material are affected in negative direction.

This problem is solved by the present invention in a simple and effective way.

According to the invention, the atomized active carbon is applied on a fibre material in aqueous suspension by adding a tenside to the suspension.

According to an especially important embodiment of the method according to the invention, active carbon in sheet form is produced in that the atomized carbon is applied on cellulose fibres in suspension, and that thereafter sheets are formed of the suspension.

The amount of carbon contained in the carbon - cellulose pulp mixture is 1-65%.

The amount of added tenside should be so that the tenside concentration in the fibre suspension is $10^{-7}$ - $10^{-1}$ %.
Suitable tensides have proved to be quarternary ammonium compounds based on dinonylphenol, for example Berocell 564.

For measuring the absorption of the material produced an absorption test with methylene blue was used.

A certain amount of the material was shaken in a solution of methylene blue, the material was filtered off, and the colour depth of the solution was measured in a spectrophotometer.

At experiments for the manufacture of cellulose fibres coated with active carbon different pulp types were used, viz. unbleached pine sulphate pulp, bleached pine sulphate pulp, bleached birch sulphate pulp and chemi-mechanical pulp, so-called CTMP. From the different pulp types a suspension with a concentration of 3 g/l was made. The desired carbon amount was added to 1 litre of the suspension in question. To the pulp suspension a cationic tenside was added in an amount of 0,02 ml/g pulp. After careful stirring resulting in the safe wetting of all carbon, the mixture was moulded to sheet form. After the moulding, the sheet was pressed and dried on a rotary drier at 60°C for 2 hours. The results obtained are shown in the Table below.

| Pulp | Charged carbon amount % | Real carbon amount % | Retention % | Absorption Theor. mg MB/g x) | mg MB/g | mg MB/g carbon | Theor. porport. % |
|---|---|---|---|---|---|---|---|
| Carbon | - | | | 114 | | | |
| Unbleached pine sulphate pulp | 0 | 0 | | 25 | | | |
| | 10 | 5,7 | 57 | | | | |
| | 20 | 16,5 | 83 | | | | |
| | 30 | 15,3 | 51 | 30 | 38 | 58 | 79 |
| Bleached pine sulphate pulp | 0 | 0 | | 0 | | | |
| | 10 | 5,9 | 59 | | | | |
| | 20 | 14,8 | 74 | | | | |
| | 30 | 23,8 | 79 | 20 | 27 | 84 | 74 |
| Bleached birch sulphate pulp | 0 | 0 | | 17 | | | |
| | 10 | 7,3 | 73 | | | | |
| | 20 | 18,4 | 92 | | | | |
| | 30 | 24 | 80 | 24 | 40 | 46 | 60 |
| CTMP | 0 | 0 | | 22 | | | |
| | 10 | 8 | 80 | | | | |
| | 20 | 13,2 | 66 | | | | |
| | 30 | 25,6 | 85 | 28 | 46 | 46 | 61 |

x) MB = methylene blue

As is apparent from the test results, it is possible to make sheets of carbon and cellulose pulp with good retention of the carbon and without deteriorating the absorption capacity of the carbon.

The invention is not restricted to the embodiments described, but can be varied within the scope of the invention idea.

Claims

1. A method at the manufacture of fibre material containing atomized active carbon in aqueous suspension, c h a r a c t e r i z e d i n that prior to the addition of the active carbon a tenside is added to the aqueous suspension of the fibre material.

2. A method as defined in claim 1, c h a r a c t e r i z e d i n that the tenside is used in a concentration of $10^{-7}$ - $10^{-1}$ %.

3. A method as defined in claim 1 or 2, c h a r a c t e r i z e d i n that the tenside consists of a quarternary ammonium compound of dionylphenol.

4. A method as defined in the claims 1-3, c h a r a c t e r i z e d i n that the fibre material consists of cellulose pulp.

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

| Category * | Citation of Document, with indication, where appropriate, of the relevant passages | Relevant to Claim No |
|---|---|---|
| A | US, A, 3 969 268 (TOYOBO CO, LTD) 13 July 1976 | |
| A | GB, A, 1 173 143 (THE SECRETARY OF STATE FOR DEFENSE) 3 December 1965 | |
| A | US, A, 4 239 516 (M KLEIN) 16 December 1980 | |
| A | US, A, 3 034 947 (J CONLISK) 15 May 1962 | |
| A,E | EP,A1, 0 145 849 (AMERICAN CYANAMID CO) 26 June 1985 | |
| A,E | EP,A1, 0 144 553 (AMERICAN CYANAMID CO) 29 May 1985 | |

# INTERNATIONAL SEARCH REPORT

International Application No PCT/SE85/00502

## I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC 4

D 21 D 3/00, D 21 H 3/78

## II. FIELDS SEARCHED

Minimum Documentation Searched [7]

| Classification System | Classification Symbols |
|---|---|
| IPC | D 21 D 3/00; D 21 H 3/12, /66, /78, 5/00, /12, /14, /22 |
| US Cl | 162:141, 142, 146, 150, 158, 164, 181, 182, 183 |

Documentation Searched other than Minimum Documentation to the Extent that such Documents are included in the Fields Searched [8]

SE, NO, DK, FI classes as above

## III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

| Category [10] | Citation of Document, [11] with indication, where appropriate, of the relevant passages [12] | Relevant to Claim No. [13] |
|---|---|---|
| Y | Chemical Abstracts, vol 82 (1975) abstract No 32714 & JP 7 466 590 (TOYO PULP CO, LTD) 27 June 1974 | 1-2,4 |
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| A | US, A, 4 289 513 (THE MEAD CORP) 15 September 1981 | |
| A | Chemical Abstracts, vol 98 (1983) abstract No 127 998 & PCT WO 82/04271 (K HOLBEK) | |

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## IV. CERTIFICATION

| Date of the Actual Completion of the International Search | Date of Mailing of this International Search Report |
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| 1986-03-19 | 1986 -03- 25 |
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Form PCT/ISA/210 (second sheet) (January 1985)